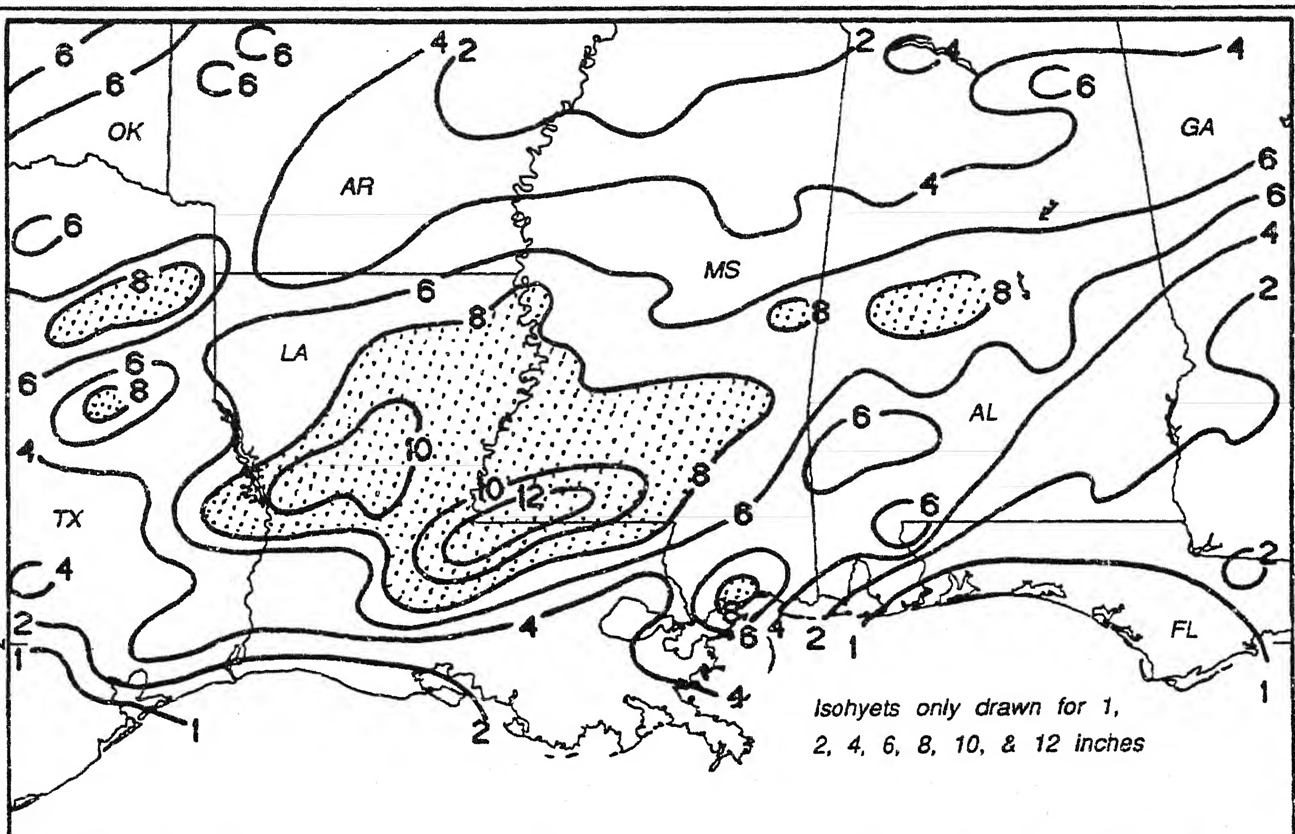
CLIMATE ANALYSIS CENTER

CONTAINS:
UPDATE ON REGIONAL U. S. DRYNESS

WEEKLY CLIMATE BULLETIN

No. 90/04 | **Washington, DC** | **January 27, 1990**



Total Precipitation (Inches)   January 14-27, 1990   Stippled areas more than 8 inches

*1990 HAS GOTTEN OFF TO AN EXCEPTIONALLY WET START IN THE SOUTH–CENTRAL GREAT PLAINS, LOWER MISSISSIPPI VALLEY, AND CENTRAL GULF COAST. UP TO 13.5 INCHES OF RAIN HAVE FALLEN DURING THE PAST TWO WEEKS, CREATING SEVERE FLOODING ALONG THE AMITE RIVER IN SOUTHEASTERN LOUISIANA. IN SHARP CONTRAST, MOISTURE SHORTAGES CONTINUED IN SECTIONS OF THE WESTERN CORN BELT, NORTHERN GREAT PLAINS, AND FAR WEST. FOR AN UPDATE ON DRYNESS FROM THE **MIDWEST**, THE **HIGH PLAINS REGIONAL**, AND THE **WESTERN REGIONAL CLIMATE CENTERS**, REFER TO THE SPECIAL CLIMATE SUMMARY STARTING ON PAGE 15.*

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE–NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- U.S. cooling degree days (summer) or heating degree days (winter).
- Global two–week temperature anomalies.
- Global four–week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three–month precipitation anomalies (once a month).
- Global twelve–month precipitation anomalies (every three months).
- Global three–month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 27, 1990

1. *Southern Canada and eastern United States*:

UNSEASONABLY MILD WEATHER PERSISTS.

Temperature departures exceeded +12°C in portions of the northern Great Plains as zonal (west to east) flow prevented colder air in northern Canada from pushing southward. Much of the southeastern U.S. recorded maximum temperatures in excess of 25°C as the prolonged January thaw showed no signs of abating [4 weeks].

2. *Western United States and Southwestern Canada*:

HEAVY RAINS DRENCH THE NORTHWEST WHILE CALIFORNIA REMAINS DRY.

Very heavy precipitation (up to 190 mm) inundated parts of western Washington while 30 to 50 mm fell across western Oregon as dryness continued to ease. Farther south, however, little or no precipitation was observed across California and the Great Basin as both long and short–term moisture situations deteriorated [9 weeks].

3. *Southern U.S.*:

THUNDERSTORMS DROP COPIOUS RAINS.

More than twice the normal rainfall has been observed throughout the south–central Great Plains, lower Mississippi Valley, and central Gulf Coast during the past four weeks. More than 312 mm of rain deluged parts of Louisiana and caused widespread urban and river flooding, especially along the immediate Gulf Coast [2 weeks].

4. *Southern Europe*:

PRECIPITATION TOTALS INCREASE, BUT DRYNESS STILL DOMINATES.

Parts of the Germanies, Switzerland, Austria and northern Yugoslavia recorded moderate precipitation (between 20 and 60 mm), but most of the region, particularly through southern Italy and extreme eastern and southeastern Europe, observed less than 20 mm. Most stations from southern France eastward to central Romania and southward across the Italian and Balkan Peninsulas have reported less than 25% of normal precipitation during the past four weeks, and long–term moisture shortages worsened [9 weeks]. The cold snap that had affected the Balkans finally abated as above normal temperatures developed across the region [Ended at 4 weeks].

5. *Iceland, The British Isles, and Scandinavia*:

SEVERE RAIN AND WIND STORM LASHES AREA.

High winds, in excess of 45 mps (101 mph), perpetrated widespread structural damage across much of Great Britain, northern France, the Benelux countries, and southern Scandinavia as an exceptionally powerful low pressure system moved from the northeastern Atlantic Ocean through Great Britain, the North Sea, and Scandinavia. The storm also brought widespread heavy precipitation to a very large area, from Iceland eastward to Finland and southward to the western Iberian Peninsula [Episodic Event].

6. *Zimbabwe, Mozambique, and Northern Madagascar*:

ACTIVE RAINY SEASON CONTINUES.

Most stations in Mozambique and Madagascar received less than 30 mm of rain, with isolated portions of Madagascar observing up to 70 mm, as the recent drenching rains slackened slightly. Farther west, heavy rainfall persisted as 50 to 100 mm dampened most of Zimbabwe and Zambia [4 weeks]

7. *Northeastern Australia*:

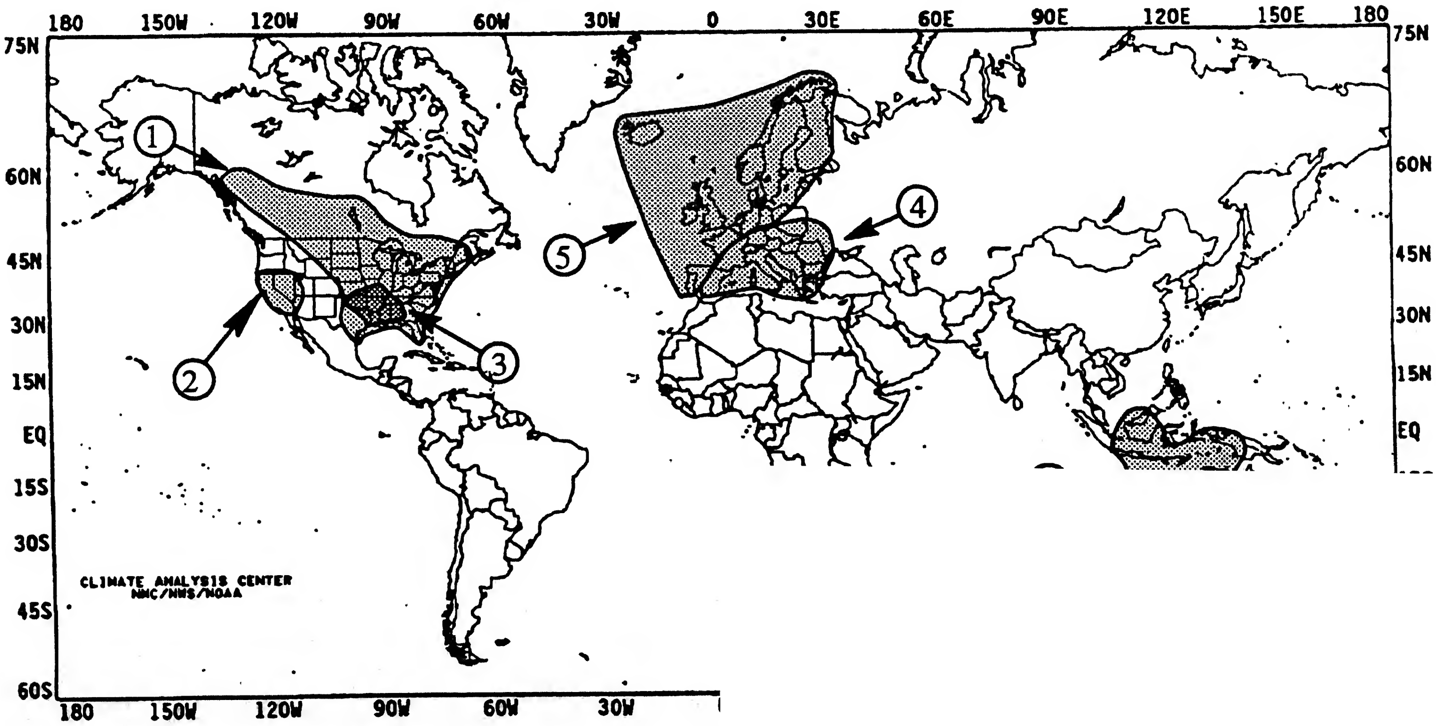
ANOTHER WEEK OF SUBNORMAL RAINFALL.

Less than 20 mm of rain fell across eastern and central Queensland as unseasonably dry weather plagued the region. Much of the afflicted area has received less than 25% of rain during the past four weeks [6 weeks].

8. *Indonesia, Northern and Western Australia*:

INUNDATING RAINS REPORTED THROUGHOUT REGION.

Intense rainfall (up to 350 mm) flooded southern portions of the Indonesian Sunda Islands while 80 to 100 mm fell throughout Malaysia and northern Indonesia for the second consecutive week. Farther south, between 60 and 100 mm of rain were observed across northern and western Australia as heavy rainfall pounded Arnhem Land and the Cape York Peninsula for the third successive week. In addition, Papua New Guinea also became excessively wet as 100 to 200 mm of rain were observed [2 weeks].



EXPLA

TEXT: Approximate duration of anomalies is in brackets. Precipit

MAP: Approximate locations of major anomalies and episodic e
temperature anomalies, four week precipitation anomalies,

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JANUARY 21 THROUGH JANUARY 27, 1990

Zonal (west to east) upper–air flow kept much of the nation unseasonably mild, especially in the north–central U.S. where departures approached +23°F, while several storm systems brought widespread precipitation to the northwestern quarter and most of the eastern half of the country. Even though temperatures averaged well above normal in the Midwest and the Northeast, brief intrusions of cold air produced heavy snows in the northern Appalachians and eastern New England on Sunday (up to 9 inches in Rhode Island, northeastern Massachusetts, and southeastern Maine) and from Moline, IL northeastward into northern lower Michigan on Thursday (9 inches at Chicago, IL and 11 inches at Traverse City, MI). Farther south, torrential downpours from heavy thunderstorms caused some flooding in southeastern Louisiana and southwestern Mississippi, the second straight week of copious rainfall in the area (see front cover). Drier and colder conditions prevailed in Alaska as temperatures moderated to near normal levels. In contrast, heavy rains soaked portions of the Hawaiian Islands while temperatures generally averaged 2–3°F above normal.

Early in the week, a departing storm system brought rain, freezing rain, sleet, and snow to the Northeast while scattered showers dampened parts of northern Florida. High winds buffeted the northern and central Rockies and High Plains, and gusty Santa Ana winds developed in southern California. A cold front produced rain along the Pacific Northwest Coast and heavy snows in the Cascades. On Tuesday, a storm system formed in the central Great Plains and rapidly pushed northeastward, generating light precipitation throughout the nation's midsection.

By mid–week, the storm in the central U.S. had moved into southern Ontario while two new low pressure centers developed over Oklahoma and southeastern Texas. Strong thunderstorms broke out in Louisiana and southern Mississippi, and the combination of heavy snows and high winds created blizzard–like conditions in northern Illinois, southern Wisconsin, and lower Michigan. Farther west, another storm system invaded the Pacific Northwest as 17 inches of snow fell on Stevens Pass in the Washington Cascades.

Towards the week's end, light to moderate precipitation occurred throughout most of the East as both low pressure centers trekked northeastward. There was some flooding reported in New England due in part to ice jams on rivers and rapidly melting snow cover from heavy rains and mild weather. By Saturday night, a cold front stretched across the central U.S. while yet another Pacific storm system moved into Washington.

According to the River Forecast Centers, the greatest weekly precipitation totals were found in the lower Mississippi Valley and the central Gulf Coast as up to 12.3 inches of rain drenched central Louisiana (see Table 1). More than 2 inches of rain fell from southeastern Texas northeastward into western South Carolina, while 2–3 inches of precipitation were recorded in central and eastern New England. In the Far West, several locations in western Oregon and Washington and the northern Cascades measured between 2 and 7 inches. Wet weather affected most of Hawaii, particularly the eastern and western–most islands, as Kokee and Lihue on Kauai received more than 7 inches while Hilo on Hawaii measured over 5 inches. Elsewhere, light to moderate amounts were observed along the northern half of the Pacific Coast, across southeastern Alaska, in the northern Rockies, and throughout most of the eastern half of the nation.

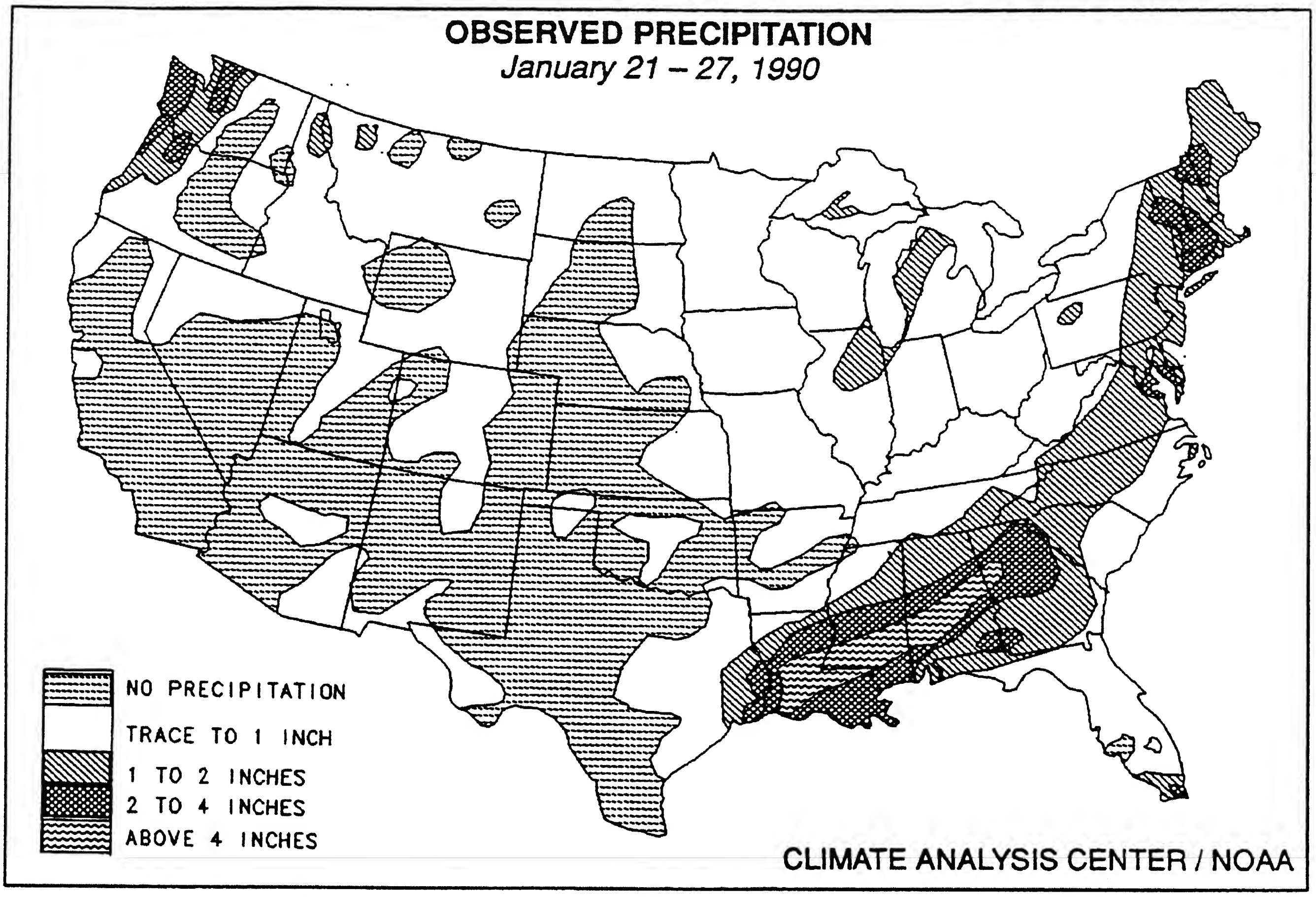
Little or no precipitation was reported along the southern half of the West Coast, in the southern three–quarters of the Intermountain West, the southern and central Rockies, throughout most of the Plains, in the south–central Mississippi Valley, and across southern Florida. For an update on short and long–term dryness in the Midwest, High Plains, and Western regions, refer to the enclosed Special Climate Summary condensed from each region's climate centers.

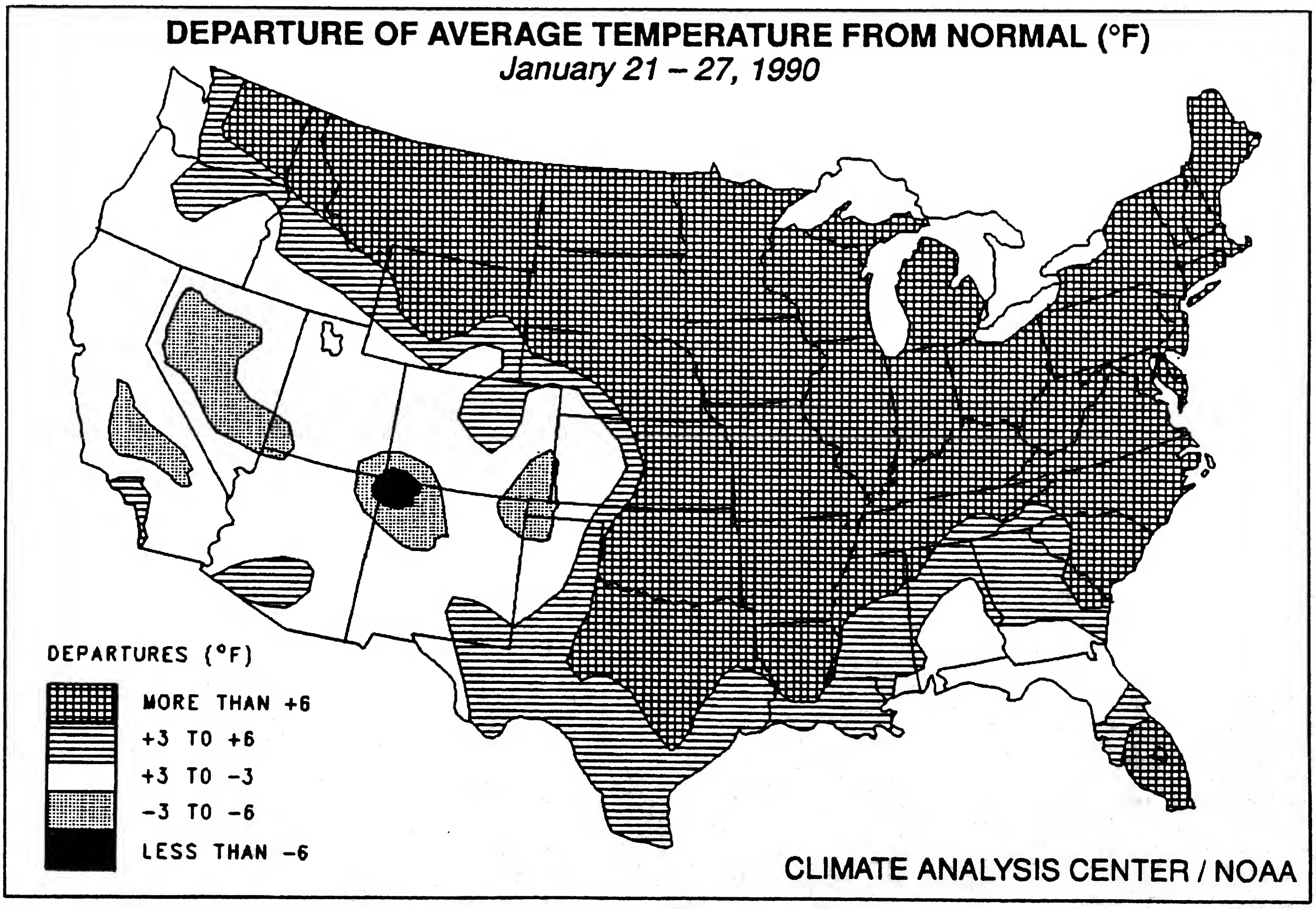
The January thaw continued across much of the lower 48 states as temperatures averaged more than 10°F above normal north of a line drawn from the northern Rockies southeastward to the south–central Great Plains and northeastward to the northern Appalachians. The greatest positive departures (above +17°F) were recorded in the northern Great Plains and upper Midwest (see Table 2). This marked the fifth consecutive week with unseasonably mild weather in the northern Rockies, Plains, and upper Midwest, and the fourth successive week with well above normal temperatures in the Ohio Valley and eastern Great Lakes. The mild weather, however, produced surprisingly few daily maximum temperature records as most of them occurred in Florida. Highs topped 70°F as far north as the Delmarva Peninsula and along the southern Atlantic Coast while sixties were common in the mid–Atlantic, central Appalachians, and middle Mississippi Valley (see Figure 1). Colder air filtered into most of Alaska, but temperatures still averaged above normal for the week in the south–central and southeastern sections of the state.

In contrast, colder than usual conditions were reported for the second straight week in the southwestern quarter of the nation, but negative departures were generally within 5°F of normal. Farther north, parts of northern and western Alaska observed temperatures between 3°F and 12°F below normal (see Table 3)

TABLE 1. Selected stations with 2.50 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
KOKEE, KAUAI, HI	7.86	ATLANTA, GA	3.52
LIHUE, KAUAI, HI	7.08	BATON ROUGE, LA	3.40
MCCOMB, MS	5.71	ASTORIA, OR	3.26
HILO/LYMAN, HAWAII, HI	5.54	MERIDIAN NAS, MS	3.05
QUILLAYUTE, WA	5.32	LAKE CHARLES, LA	2.82
MONTGOMERY, AL	4.92	CENTERVILLE, GA	2.74
MONTGOMERY/MAXWELL AFB, AL	4.45	LAFAYETTE, LA	2.67
ALEXANDRIA/ENGLAND AFB, LA	4.17	CHATHAM, MA	2.64
BILOXI/KEESLER AFB, MS	4.11	HOQUIAM, WA	2.53
MERIDIAN, MS	4.05	OLYMPIA, WA	2.52
MT. WASHINGTON, NH	3.72	SOUTH WEYMOUTH, MA	2.51


OBSERVED PRECIPITATION
January 21 – 27, 1990
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS CENTER / NOAA


DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
January 21 – 27, 1990
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE ANALYSIS CENTER / NOAA

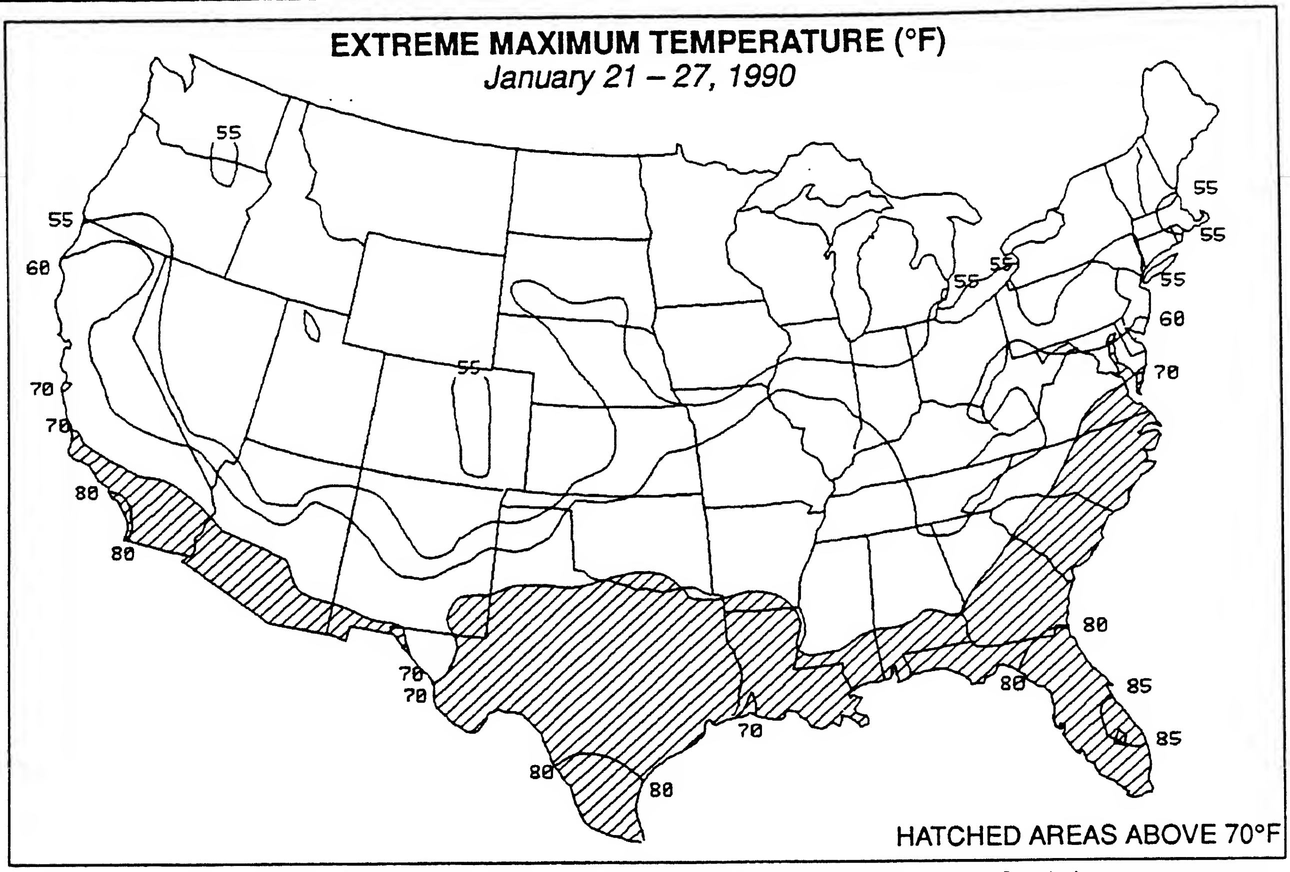


Figure 1. Extreme maximum temperatures (°F) during the week of January 21-27, 1990. Shaded areas are more than 70°F, and isotherms are only drawn for 55°F, 60°F, 70°F, 80°F, and 85°F. Although temperatures averaged more than 10°F above normal throughout the north-central and northeastern U.S., there were few daily maximum temperature records established during the week. The majority of the records were set in Florida as highs soared into the eighties. Elsewhere, readings topped 70°F as far north as the Delmarva Peninsula while sixties prevailed in the mid-Atlantic, central Appalachians, and middle Mississippi Valley.

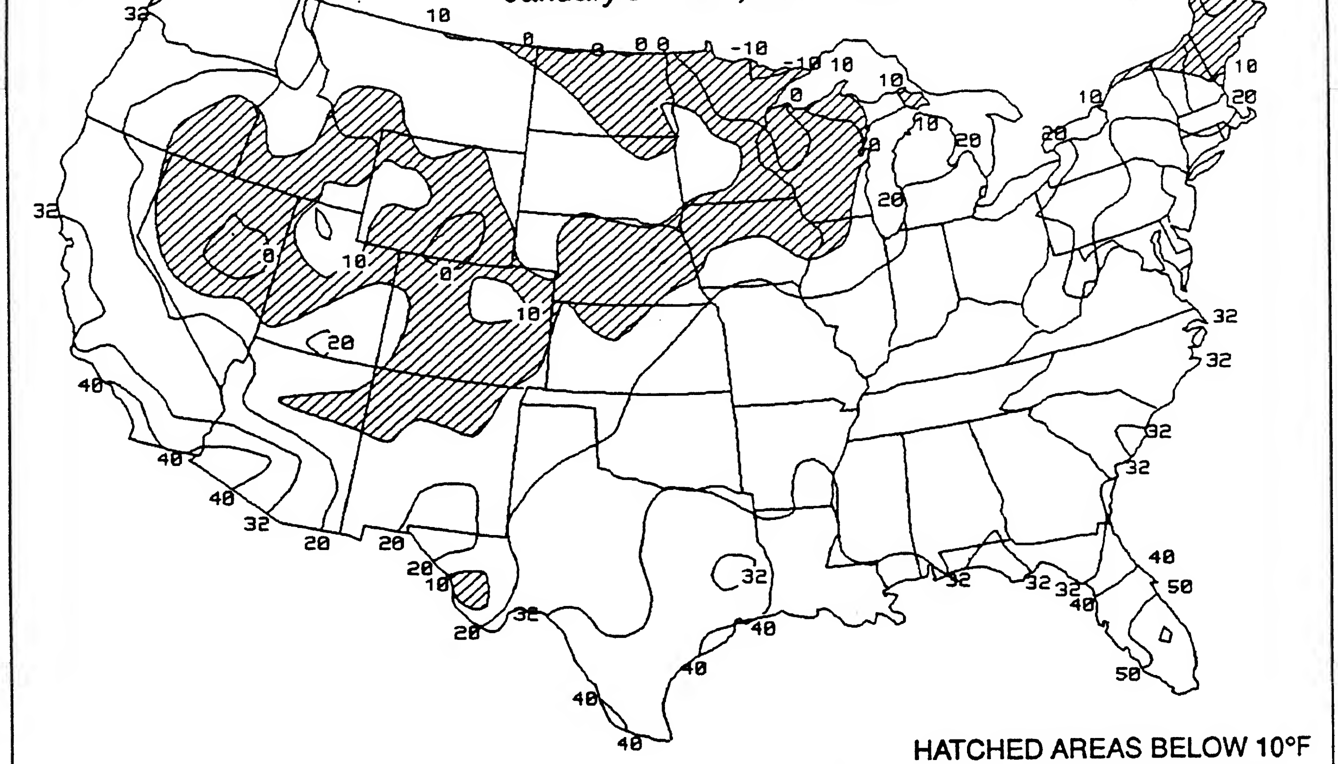
TABLE 2. Selected stations with temperatures averaging 15.0°F or more ABOVE normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
FARGO, ND	+23.4	27.5	ST. LOUIS, MO	+17.9	46.7
GRAND FORKS, ND	+22.9	24.7	MILES CITY, MT	+17.6	31.8
JAMESTOWN, ND	+21.9	27.0	SIOUX FALLS, SD	+17.4	29.8
ABERDEEN, SD	+21.4	29.2	MINNEAPOLIS, MN	+17.3	28.1
DEVIL'S LAKE, ND	+21.2	24.0	DICKINSON, ND	+17.1	27.8
HAVRE, MT	+20.8	32.9	PICKSTOWN, SD	+17.0	35.2
GLASGOW, MT	+20.8	29.0	QUINCY, IL	+16.1	39.5
ALEXANDRIA, MN	+20.3	25.4	BURLINGTON, VT	+16.1	32.1
MINOT, ND	+20.1	26.1	SPRINGFIELD, IL	+15.9	39.7
ST. CLOUD, MN	+20.0	27.0	ROCHESTER, MN	+15.7	25.2
HURON, SD	+19.9	31.0	INTERNATIONAL FALLS, MN	+15.6	15.8
BISMARCK, ND	+19.7	26.3	MASSENA, NY	+15.4	29.7
WILLISTON, ND	+19.6	26.6	VALENTINE, NE	+15.2	33.3
WATERTOWN, SD	+19.1	26.9	UTICA, NY	+15.1	34.7
PIERRE, SD	+18.8	33.8	WARROAD, MN	+15.1	16.7

TABLE 3. Selected stations with temperatures averaging 3.0°F or more BELOW normal for the week.

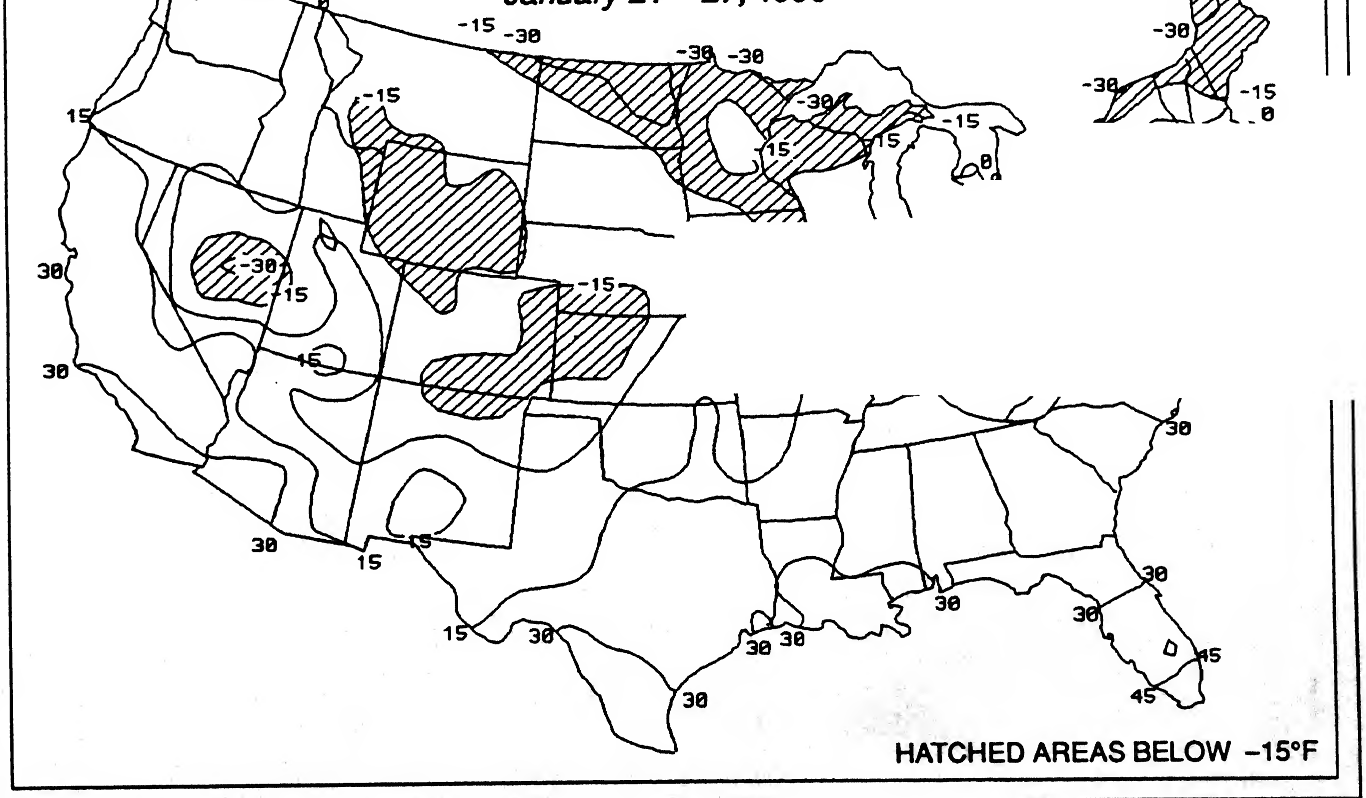
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
BARTER ISLAND, AK	-12.0	-27.5	CALIENTE, NV	-4.1	29.1
FARMINGTON, NM	-8.4	21.9	TALKEETNA, AK	-4.0	5.7
LOVELOCK, NV	-5.7	25.6	ST. PAUL ISLAND, AK	-4.0	21.7
BAKERSFIELD, CA	-5.7	43.4	LA JUNTA, CO	-4.0	25.6
BETTLES, AK	-5.3	-15.5	ADAK, AK	-3.8	29.3
DALHART, TX	-5.2	28.7	CEDAR CITY, UT	-3.6	26.5
FAIRBANKS, AK	-5.2	-16.1	ELKO, NV	-3.5	22.3
	-5.1	-20.1	ALBUQUERQUE, NM	-3.3	32.4
	-4.4	27.1	KODIAK, AK	-3.1	27.2
	-4.2	42.2			

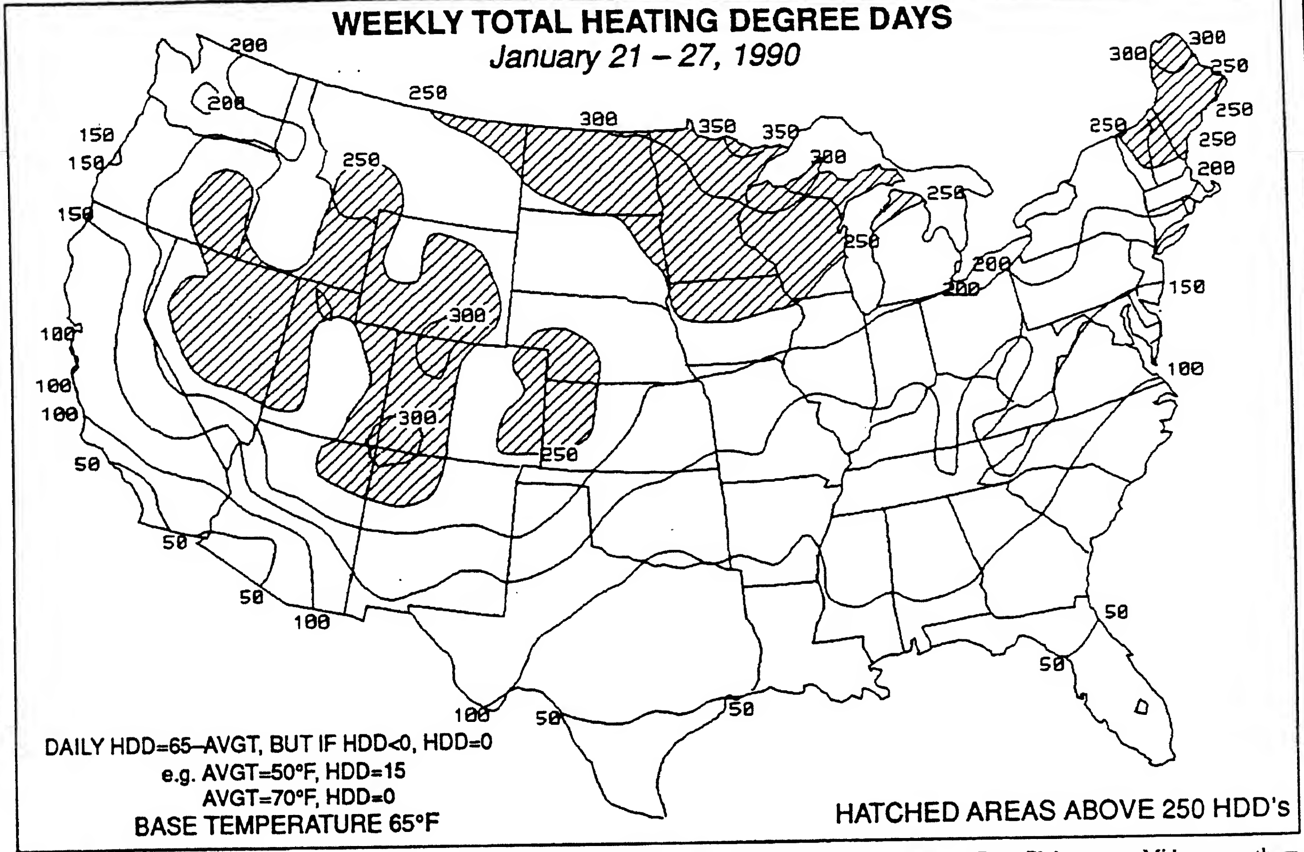
EXTREME MINIMUM TEMPERATURE (°F)
January 21 – 27, 1990



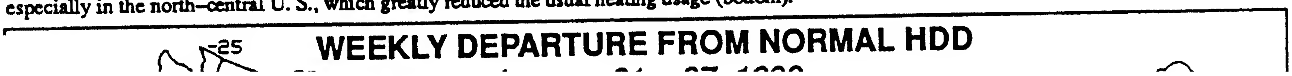
With weekly temperatures averaging between 10°F and 25°F above normal across the northern and central Plains, the Midwest, mid–Atlantic, and New England, there were few locations with readings below 0°F (top). Even though weekly temperatures were above normal, strong winds produced dangerous wind chills (less than –15°F) across most of the central Rockies and High Plains, the Great Basin, the northern Great Plains, upper Midwest, and northern New England (bottom).

MINIMUM WIND CHILL (°F)
January 21 – 27, 1990



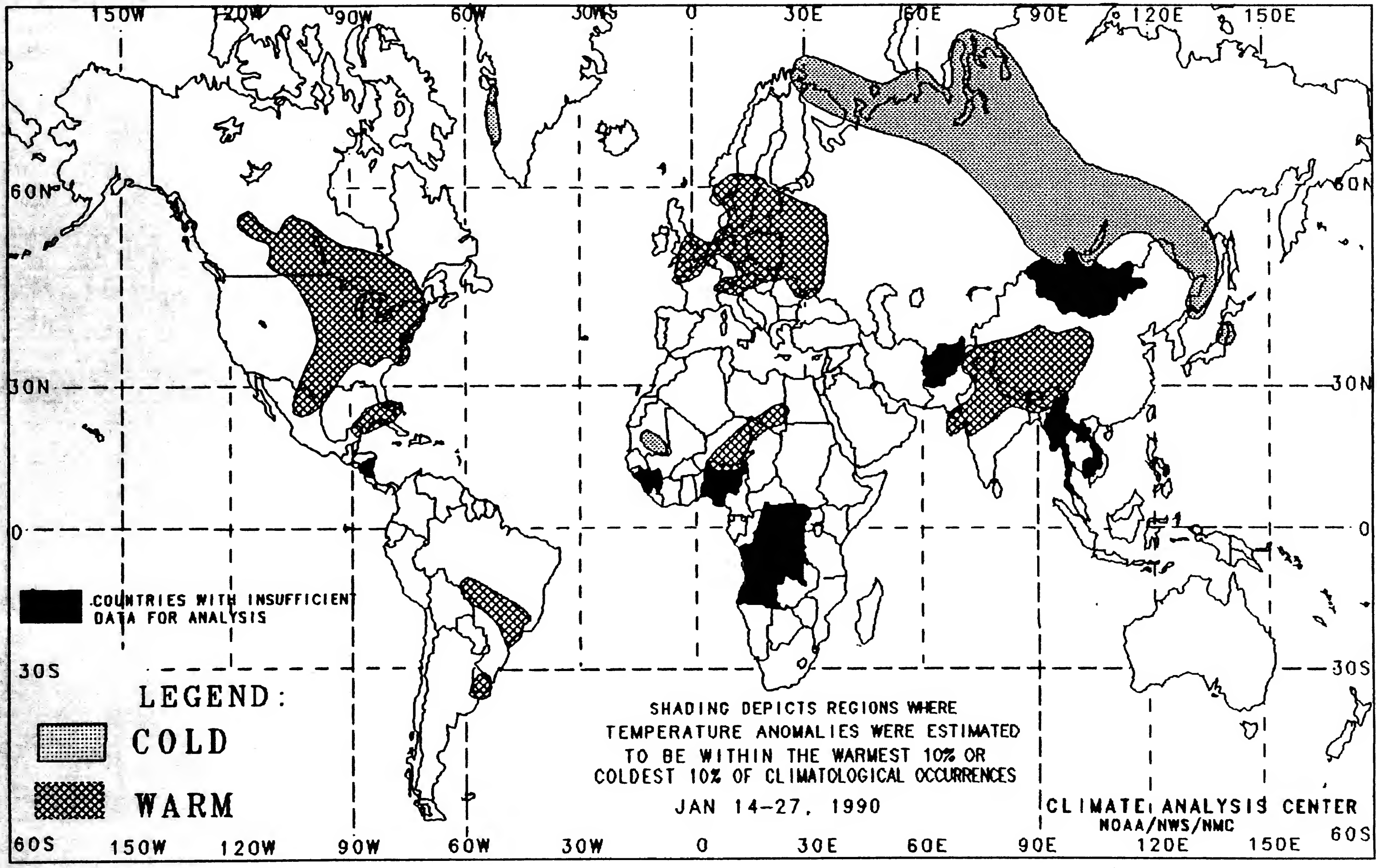


Unseasonably mild weather once again limited areas with weekly heating totals above 250 HDDs to the northern Great Plains, upper Midwest, northern New England, and parts of the Rockies and Great Basin (top). With the exception of the central Pacific Coast, Great Basin, and south–central Rockies, where colder than normal conditions increased the weekly heating demand, temperatures averaged much above normal across the remainder of the lower 48 states, especially in the north–central U. S., which greatly reduced the usual heating usage (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

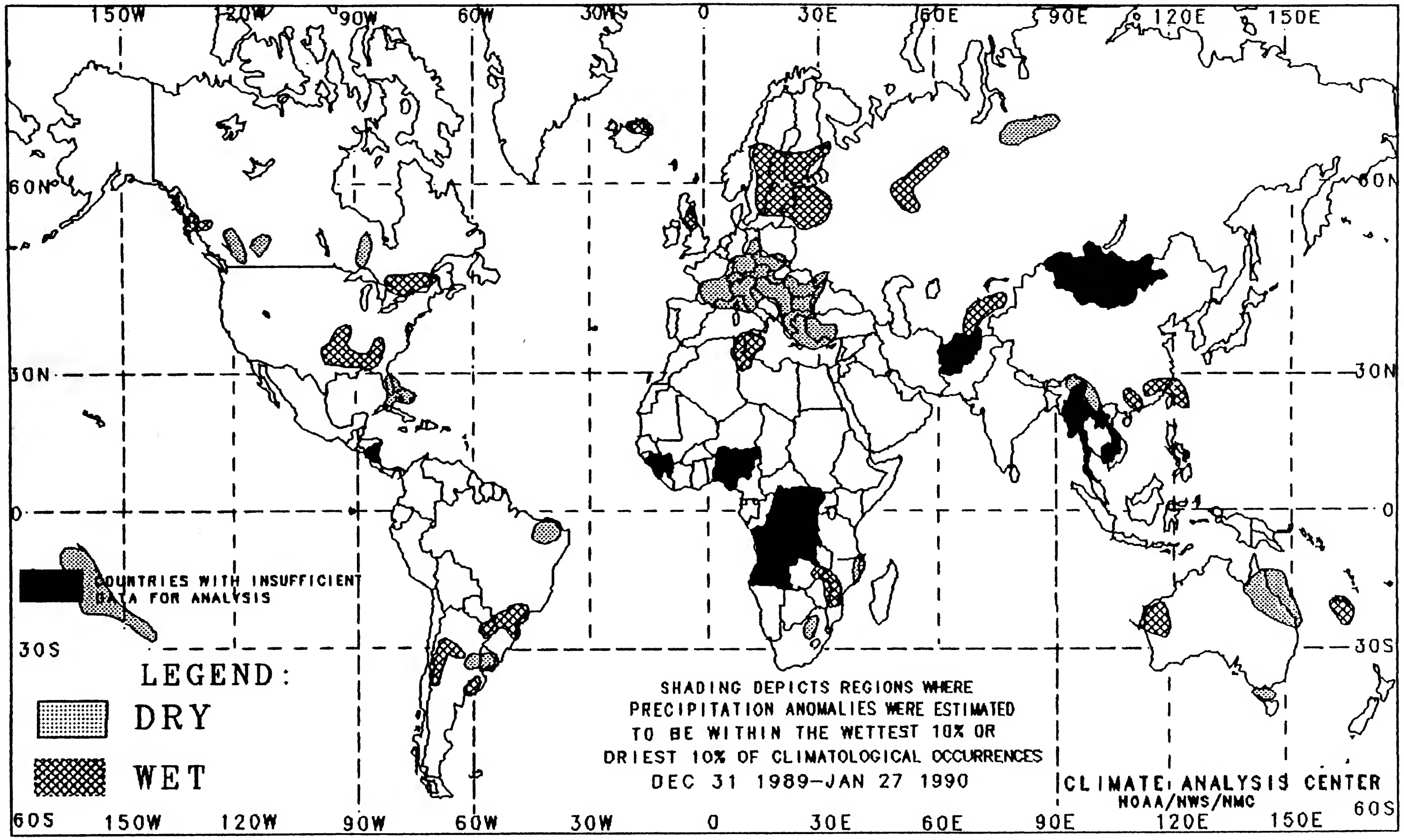
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

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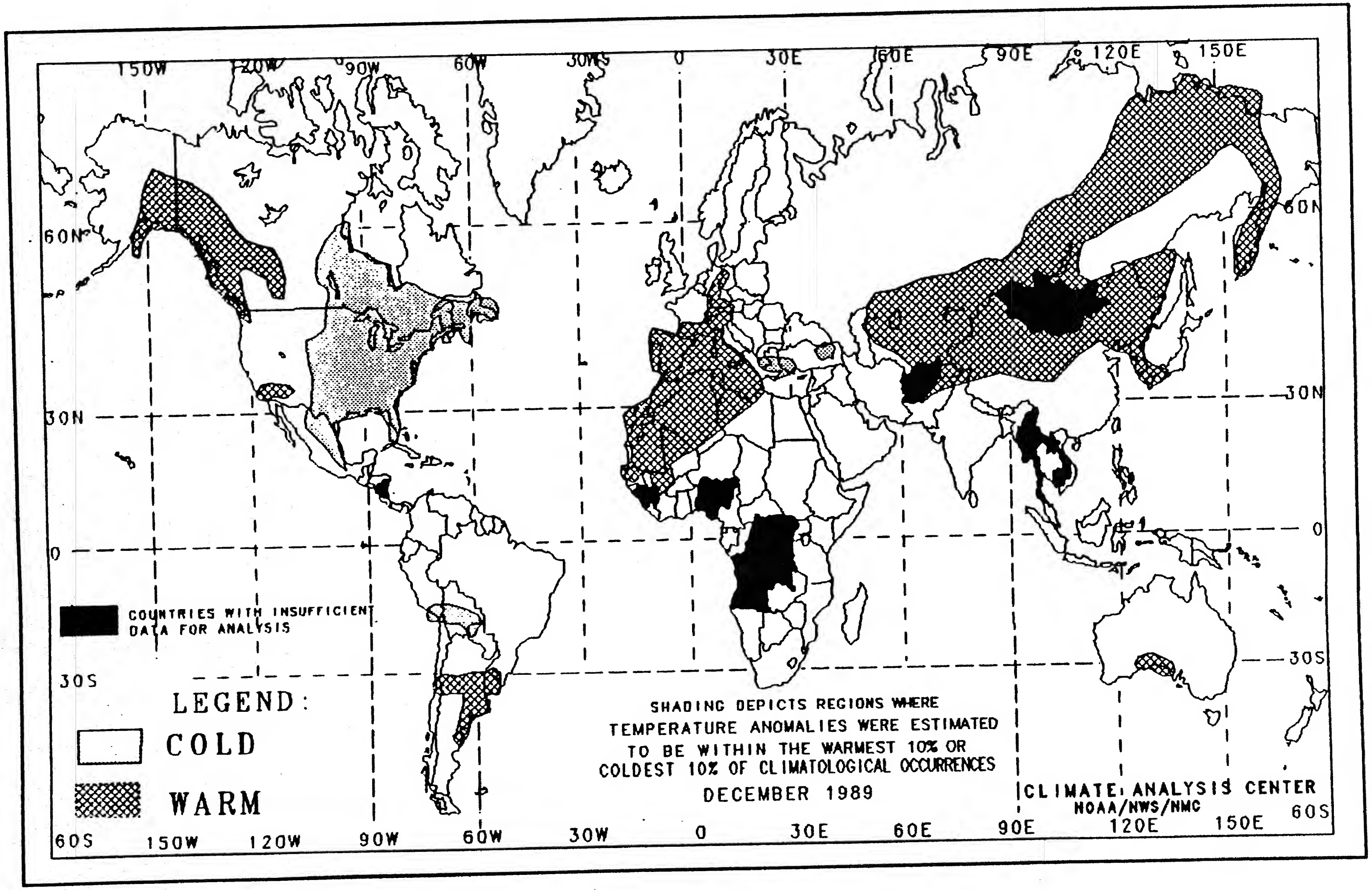
GLOBAL TEMPERATURE ANOMALIES

DECEMBER 1989



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... not depicted unless the magnitude of temperature departures from

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The chart shows general areas of one month temperature anomalies. Caution must be used in

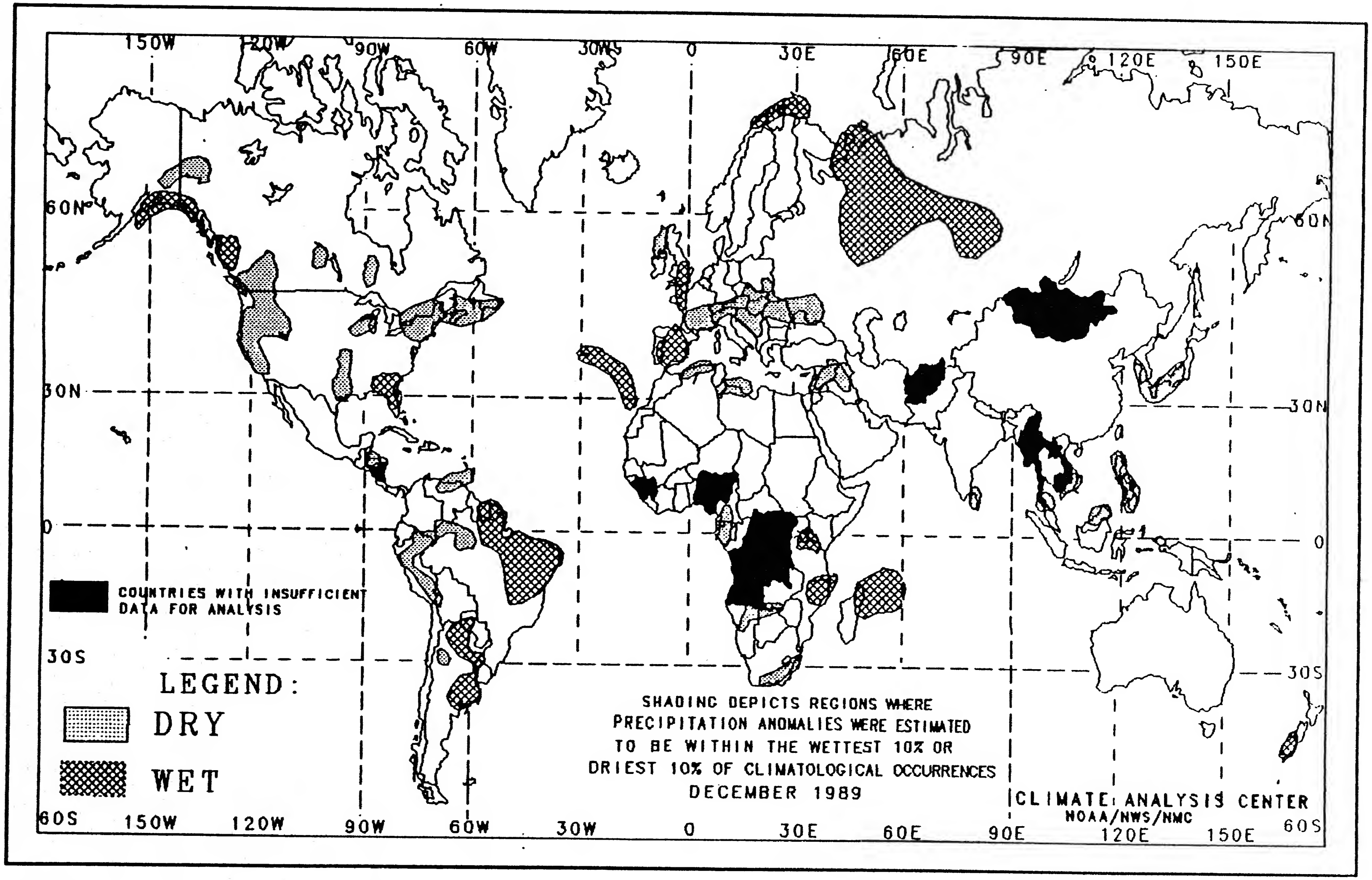
PRINCIPAL TEMPERATURE ANOMALIES

DECEMBER 1989

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
Southeastern Alaska and Western Canada	−19 to +9	+3 to +10	MILD – 2 to 10 weeks
Southern California and Southern Arizona	+14 to +16	Around +2	Very warm early and late December
United States, Eastern Canada, and Northeastern Mexico	−26 to +20	−2 to −10	COLD – 5 to 14 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Peru, Bolivia, and Paraguay	+12 to +27	−2 to −3	COOL – 2 to 12 weeks
Uruguay, Argentina, and Adjacent Brazil	+22 to +28	+2 to +3	WARM – 2 to 5 weeks
EUROPE AND THE MIDDLE EAST			
Southwestern and Central Europe	−8 to +18	+2 to +5	WARM – 5 to 14 weeks
Southeastern Greece and Southwestern Turkey	+10 to +11	Around −2	Very cold first half of December
Northeastern Turkey	−5 to −10	Around −5	COLD – 4 to 9 weeks
AFRICA			
Northwestern Africa	+13 to +27	+2 to +4	WARM – 4 to 10 weeks
ASIA			
Central and Eastern Asia	−35 to +9	+3 to +8	WARM – 4 to 10 weeks
AUSTRALIA AND WESTERN PACIFIC			
South Central Australia	+22 to +34	Around +2	WARM – 2 to 6 weeks

GLOBAL PRECIPITATION ANOMALIES

DECEMBER 1989



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In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

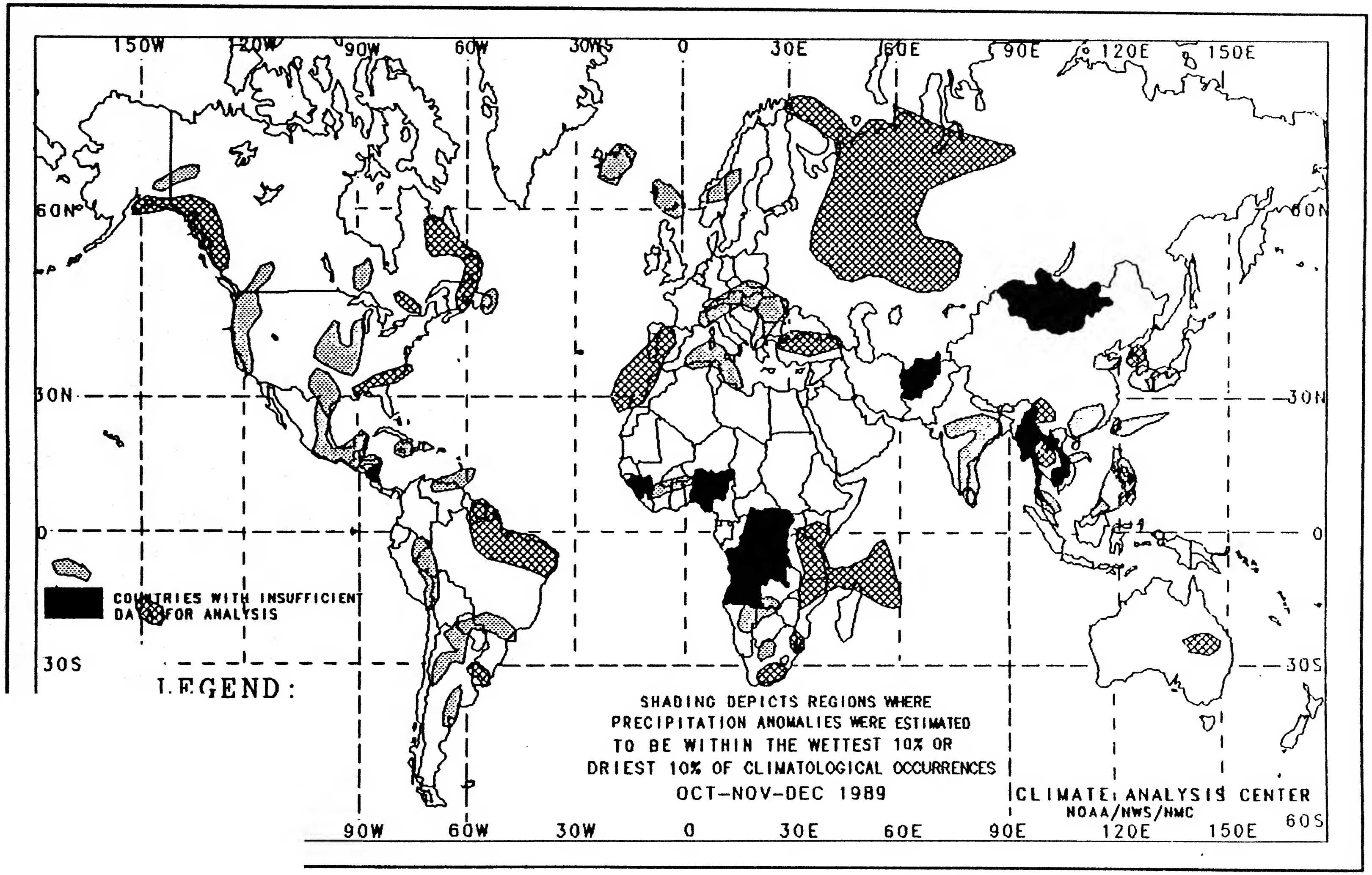
PRINCIPAL PRECIPITATION ANOMALIES

DECEMBER 1989

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
South Central Alaska	311 to 900	221 to 332	WET – 5 to 7 weeks
East Central Alaska and Adjacent Canada	0 to 5	0 to 20	DRY – 10 weeks
West Central British Columbia	98 to 546	149 to 192	WET – 2 to 4 weeks
Western United States and Southwestern Canada	0 to 125	0 to 59	DRY – 5 to 10 weeks
Central Manitoba	8 to 9	36 to 43	DRY – 5 weeks
Western Ontario	Around 0	Around 0	DRY – 9 to 12 weeks
Illinois, Iowa, and Wisconsin	6 to 10	18 to 21	DRY – 7 to 17 weeks
South Central United States	7 to 20	7 to 21	DRY – 9 to 17 weeks
Northeastern United States and Adjacent Canada	0 to 86	0 to 62	DRY – 4 to 9 weeks
Southeastern United States	114 to 233	188 to 236	WET – 4 to 6 weeks
Honduras	149 to 196	37 to 49	DRY – 4 to 8 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Venezuela and Nearby Caribbean Islands	2 to 57	4 to 42	DRY – 10 weeks
Peru, Northwestern Brazil, and Adjacent Bolivia	0 to 117	0 to 49	DRY – 4 to 10 weeks
Suriname and Eastern Brazil	319 to 512	179 to 375	WET – 7 to 8 weeks
Northwestern Argentina	4 to 21	8 to 46	DRY –. 5 weeks
Paraguay and Northeastern Argentina	147 to 316	182 to 398	WET – 2 to 8 weeks
EUROPE AND THE MIDDLE EAST			
Azores and the Canary Islands	107 to 230	163 to 259	WET – 4 to 7 weeks
Northern Ireland and Western Scotland	48 to 70	44 to 57	DRY – 4 to 9 weeks
Southern England and Northwestern France	132 to 203	204 to 231	WET – 4 to 5 weeks
Northern Norway	108 to 178	191 to 249	WET – 4 to 5 weeks
Southern Europe	3 to 36	7 to 42	DRY – 5 to 11 weeks
Spain	157 to 556	324 to 510	WET – 4 to 6 weeks
Syria and Iraq	1 to 12	2 to 17	DRY – 4 to 10 weeks
AFRICA			
Algeria	8 to 20	10 to 16	DRY – 10 weeks
Libya	0 to 2	0 to 4	DRY – 9 to 10 weeks
Cameroon, Gabon, and Equatorial Guinea	5 to 84	9 to 32	DRY – 4 to 6 weeks
Northern Tanzania	98 to 376	203 to 348	WET – 4 weeks
Northern Mozambique	183 to 316	199 to 263	Heavy precipitation early and late December
Northern Namibia and Northern Botswana	1 to 49	2 to 25	DRY – 10 weeks
Coast of South Africa	5 to 26	9 to 25	DRY – 4 to 6 weeks
Madagascar Island and Nearby Indian Ocean Islands	341 to 624	199 to 671	Heavy precipitation second half of December
ASIA			
Northwestern Soviet Union	43 to 89	156 to 242	WET – 4 to 8 weeks
Sri Lanka	9 to 102	6 to 23	DRY – 4 to 6 weeks
Korea and Japan	5 to 152	8 to 49	DRY – 5 to 8 weeks
Vietnam	2 to 9	6 to 11	DRY – 11 weeks
Southern Thailand and Northern Peninsular Malaysia	40 to 135	7 to 31	DRY – 9 to 11 weeks
AUSTRALIA AND WESTERN PACIFIC			
Northern Borneo	29 to 82	11 to 24	DRY – 6 to 10 weeks
Philippines	2 to 125	2 to 40	DRY – 4 to 14 weeks
Southern New Zealand	162 to 414	191 to 194	WET – 4 to 5 weeks

GLOBAL PRECIPITATION ANOMALIES

OCTOBER 1989 – DECEMBER 1989

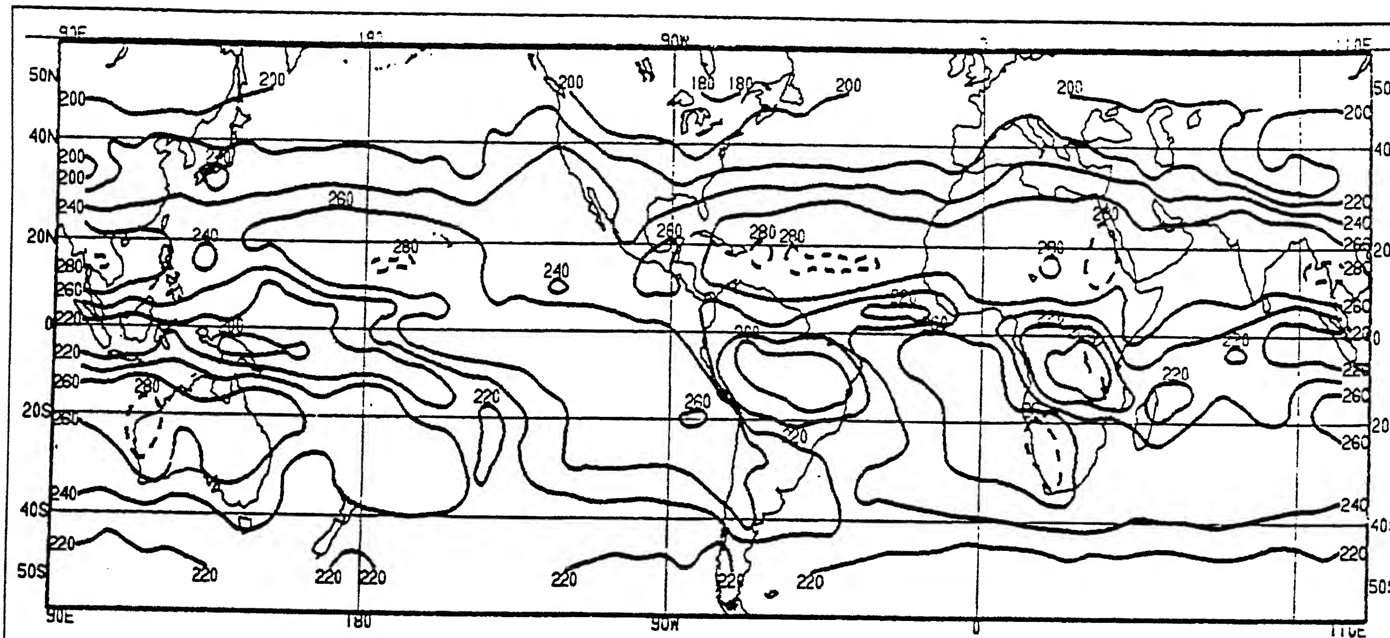


mately 2500 observing stations for which at g zero amounts) were received or estimated observations and the use of estimates from n the total precipitation amount may exist for ive resulted in an overestimation of the extent

ecipitation for the three month period is less ially, wet anomalies for such arid regions are n exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

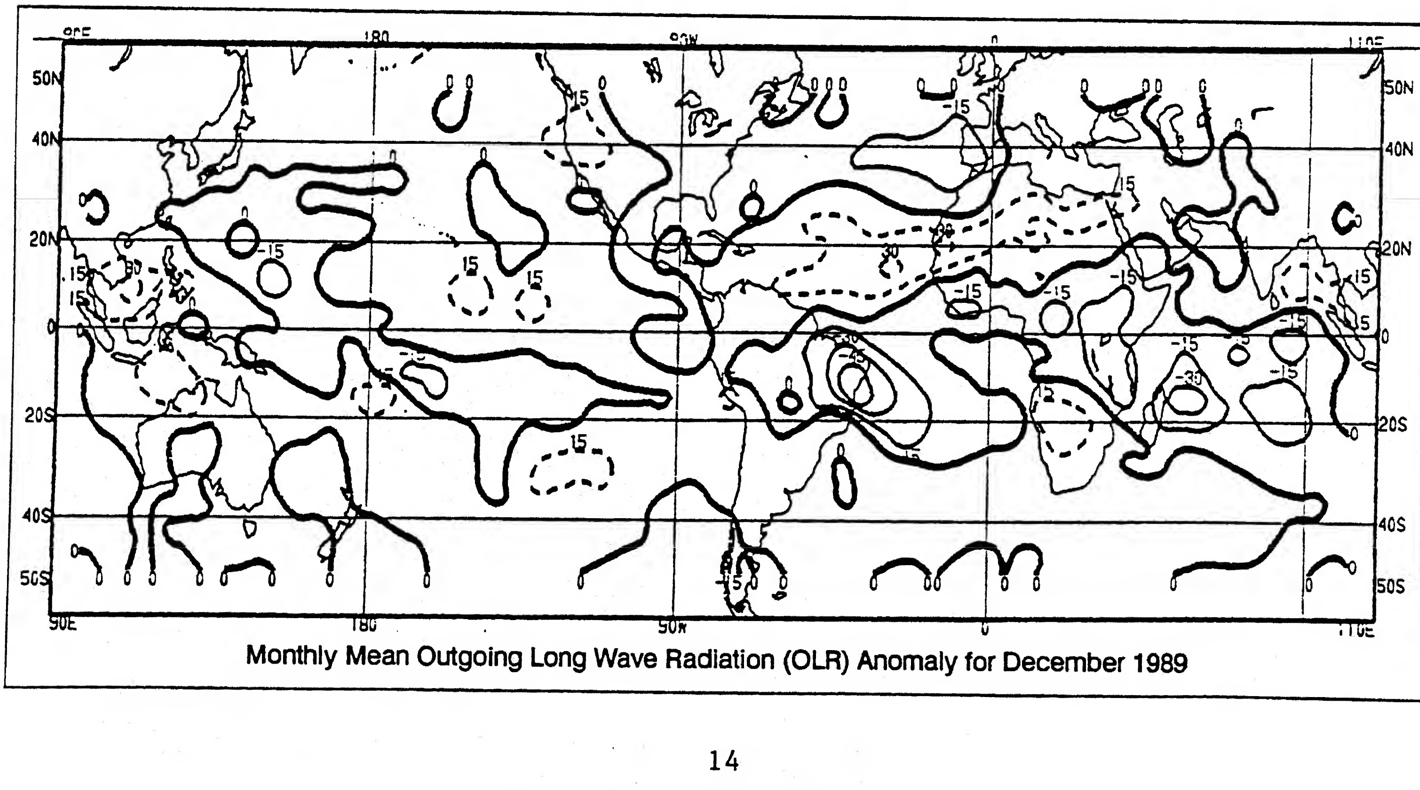


Monthly Mean Outgoing Long Wave Radiation (OLR) for December 1989

EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N - 20°S) that receive primarily convective rainfall, a mean OLR value of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 - 1988 base period mean. Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.



Monthly Mean Outgoing Long Wave Radiation (OLR) Anomaly for December 1989

SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER, NMC, NWS, NOAA

Climate Summaries obtained from the following Regional Climate Centers:

WESTERN REGIONAL CLIMATE CENTER | **MIDWEST CLIMATE CENTER**
HIGH PLAINS REGIONAL CLIMATE CENTER | **SOUTHEAST REGIONAL CLIMATE CENTER**

UPDATE ON REGIONAL DRYNESS IN THE UNITED STATES

After much of the nation experienced one of the driest spring and early summer months on record during 1988, excessively wet weather in the southern and eastern U.S. during the last three–quarters of 1989 completely alleviated 1988's moisture deficits across the eastern half of the country. In southern Florida, the western Corn Belt, the northern Great Plains, and portions of the Far West, however, subnormal precipitation fell throughout most of these regions during 1989. As a result, moisture shortages developed in southern Florida and continued in the north–central and western United States.

According to the Midwest Climate Center (MCC), the last three months of 1989 were characterized by extreme dryness. Most of the region received less than 75% of the normal precipitation, and most of Minnesota, Missouri, northwestern Iowa, western Illinois, and southeastern Wisconsin recorded under half the usual precipitation (not shown). The dryness resulted in a continuation of near–record low flows on the Mississippi River at St. Louis during the winter of 1989–1990, signifying the perpetuation of hydrologic drought conditions in the upper Midwest. Based upon the long–term Palmer Drought Index (PDI) as of January 27, severe to extreme dryness existed in southern Minnesota, central Wisconsin, much of Iowa, western Illinois, and northeastern Missouri (not shown). In contrast, near normal to unusually wet conditions were found in Indiana, Ohio, Kentucky, most of lower Michigan, northeastern Illinois, southeastern Wisconsin, and southwestern Missouri.

From the analyses of historical climate and hydrologic data, the amount of future precipitation required to end the drought by mid–summer was calculated and is depicted by Figure 1. With two successive years of below normal precipitation, an exceptionally large amount of precipitation would be needed to allay long–term dryness in the western Corn Belt and the upper Midwest. Unfortunately, the odds suggested a continuation of the 1988 and 1989 hydrologic drought well into 1990. On the other hand, agriculture may not be as severely impacted because the topsoil (upper 6 feet) can recover faster than the deeper soil layers. Based upon estimates by the MCC's soil moisture model, probabilities are high that topsoil moisture levels will be adequate by May 1, the approximate start of the growing season (see Figure 2). The exceptions included the northwestern portions of the region which have less than a 50% chance for near–normal moisture.

One of the few states with moisture shortages in the South and East was Florida. Moderate to severe drought continued in the southern sections of the state after most of the area received less than 75% of the annual precipitation in 1989. According to the Southeast Regional Climate Center, soil moisture and lake levels have fallen or remained stable during January. Since January 1, below normal rainfall combined with above normal temperatures increased the seasonal demand for water by agriculture. Voluntary water restrictions were imposed in many southern Florida counties and mandatory restrictions existed in municipalities surrounding Miami.

In the High Plains (ND, SD, NE, KS, CO, WY), long–term dryness also afflicted much of the region. Similar to the western portions of the Midwest, the Drought of 1988 severely hit the northern Plains, and many locations measured subnormal 1989 precipitation. Kansas recorded the driest April and November ever, but heavy summer rains partially compensated for those two months. Parts of North Dakota have reported two–year deficits of 10–12 inches, quite significant when the normal annual precipitation only totals 15–20 inches. Farther south, northern Nebraska, northern Kansas, southeastern South Dakota, and southern Wyoming, as well as North Dakota, observed moderate to extreme long–term drought for the week ending January 27. In contrast, near to above normal moisture conditions existed in southern Kansas, western South Dakota, and northeastern Wyoming. The High Plains Regional Climate Center reported that the dryness, combined with high winds, recently produced dust storms and severe soil erosion in the Dakotas and Nebraska. Low streamflow in the Missouri River has increased releases from storage dams to prevent loss of power plant cooling water and municipal drinking water at downstream intake points. Total 1989 run–off above Sioux Falls was only 28% of normal.

Since the last review of dryness in the Far West (see Weekly Climate Bulletin #89/52), overall conditions have improved in the north but have remained poor in the south, especially in southern California and Arizona. According to the Western Regional Climate Center, increased precipitation during January in the Pacific Northwest and northern Rockies pushed mountain snow water contents much closer to normal in Washington, Montana, and Wyoming (see Table 1). Mountain snow water contents in Oregon and Idaho have also improved, but values are still less than 65% of normal. After a record dry December in California, some precipitation occurred in January, but both the snow water content and the precipitation since Oct. 1, 1989 are under half of normal.

The snow water content and percent of normal precipitation (since Oct. 1) of the major river basins reflected the dryness in the West as all basins except the Missouri River recorded below normal levels (see Table 2). Based upon the January 1 conditions, the spring and summer streamflow forecasts, produced by the Soil Conservation Service and the National Weather Service in Portland, OR, predicted below average streamflow in most southern and central areas with near average streamflow in the northern sections (see Figure 3). The generous January precipitation in the Pacific Northwest, however, will probably require an updated and increased February streamflow forecast.

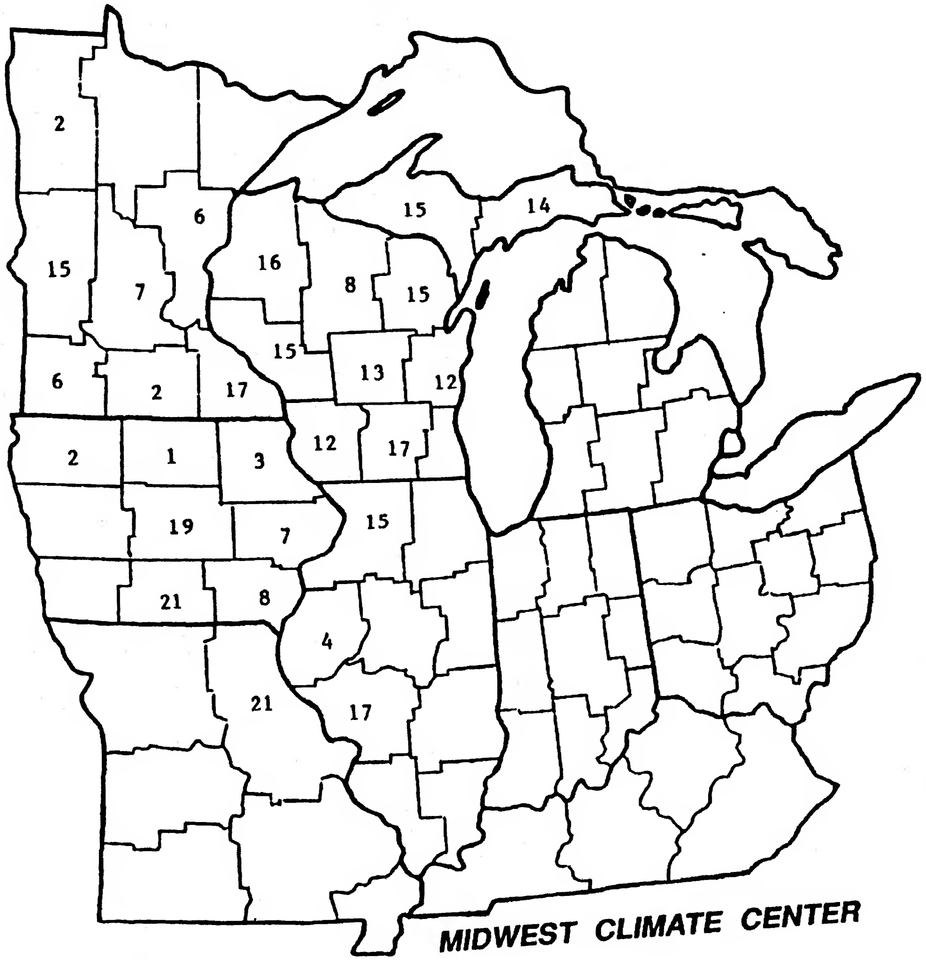


Figure 1. Probability (%) of recovering from long-term drought by mid-summer 1990, according to the Midwest Climate Center as of January 1, 1990. Only climate divisions in severe (-3<PDI>-4) or extreme drought (PDI<-4) are shown based upon the Palmer Drought Index (PDI). Analyses of historical climate data and hydrologic data were used to determine the amount of future precipitation needed to recover from the drought. For example, for northwestern Iowa to recover from its current hydrologic drought, at least 30 inches of precipitation is required during the next six months. Historical weather records for that area show only a 1 in 50 chance of obtaining that level of precipitation during the January-June 1990 period.

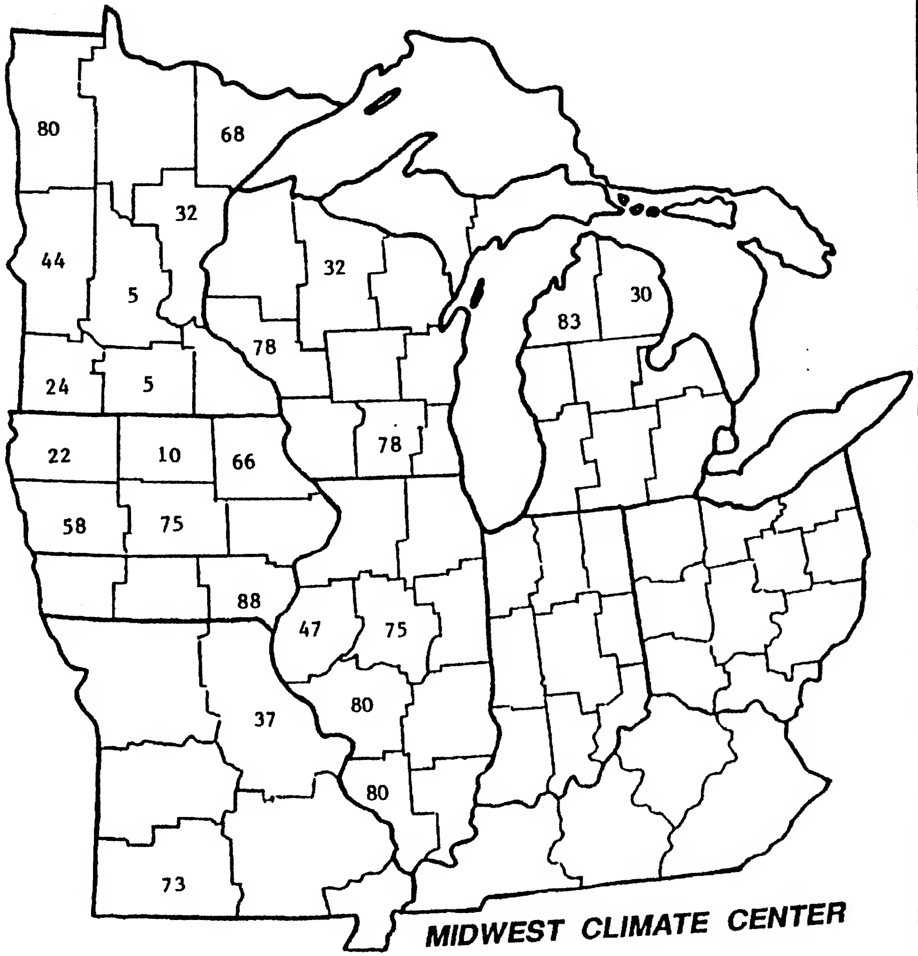


Figure 2. Probability (%) that topsoil moisture levels (upper 6 feet) will be at near normal levels by May 1, 1990, according to the Midwest Climate Center as of January 1, 1990. Climate divisions which are not numbered have probabilities greater than 90%. Historical climate data for the months January-April from 1949-1989 were used to run a soil-moisture model in a forward-looking mode to assess the likelihood that the topsoil moisture will be near normal by May 1, 1990. In the Midwest, agriculture may not be as severely impacted by drought as compared to hydrologic interests because unlike the subsoil layers (important to hydrologic systems), the topsoil layers (important to agriculture) can recover faster from drought.

State					Percent of Normal From Oct. 1, 1989–Date listed below			
	Snow Water Content				Precipitation			
	Jan29	Jan22	Jan9	Jan1	Jan29	Jan22	Jan9	Jan1
Arizona	34	41	42	25	40	44	41	34
California (Great Basin area only)	39	43	39	39	50	53	47	45
Colorado	58	58	67	56	69	68	67	65
Idaho	64	54	60	43	77	73	77	65
Montana	96	87	91	114	118	111	119	114
Nevada	57	57	52	48	56	59	67	48
New Mexico	46	46	39	60	67	65	65	60
Oregon	48	31	34	50	69	63	66	50
Utah	56	56	48	51	60	62	56	51
Washington	81	55	54	73	97	87	88	73
Wyoming	88	83	90	102	96	89	105	102
West Region (except rest of California)	67	58	60	67	79	75	77	64

WESTERN REGIONAL CLIMATE CENTER and the SOIL CONSERVATION SERVICE

Table 1. State-wide averaged percent of normal mountain snow water content at specified dates AND the percent of normal precipitation since October 1, 1989 to various specified dates, according to the Western Regional Climate Center, NOAA, and the Soil Conservation Service, USDA. Most sections in the West, with the exception of Montana, Wyoming, and Washington have recorded much below normal precipitation since October 1, 1989 and have under half the normal mountain snow water content.

River Basin					Percent of Normal From Oct. 1, 1989–Date listed below			
	Snow Water Content				Precipitation			
	Jan29	Jan22	Jan9	Jan1	Jan29	Jan22	Jan9	Jan1
Arkansas River	83	77	76	80	83	82	78	80
Colorado River	59	57	54	53	64	64	61	59
Missouri River	97	92	100	97	112	104	116	114
Columbia River	68	53	56	42	83	76	80	65
Rio Grande River	39	39	27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Great Basin	50	51	45					

Table 2. Major river basins percent of normal mountain
of normal precipitation since October 1, 1989 to vari
Climate Center, NOAA, and the Soil Conservation Ser
river basins in the West have also reported subnorm
October 1, 1989), with the exception of the Missouri R

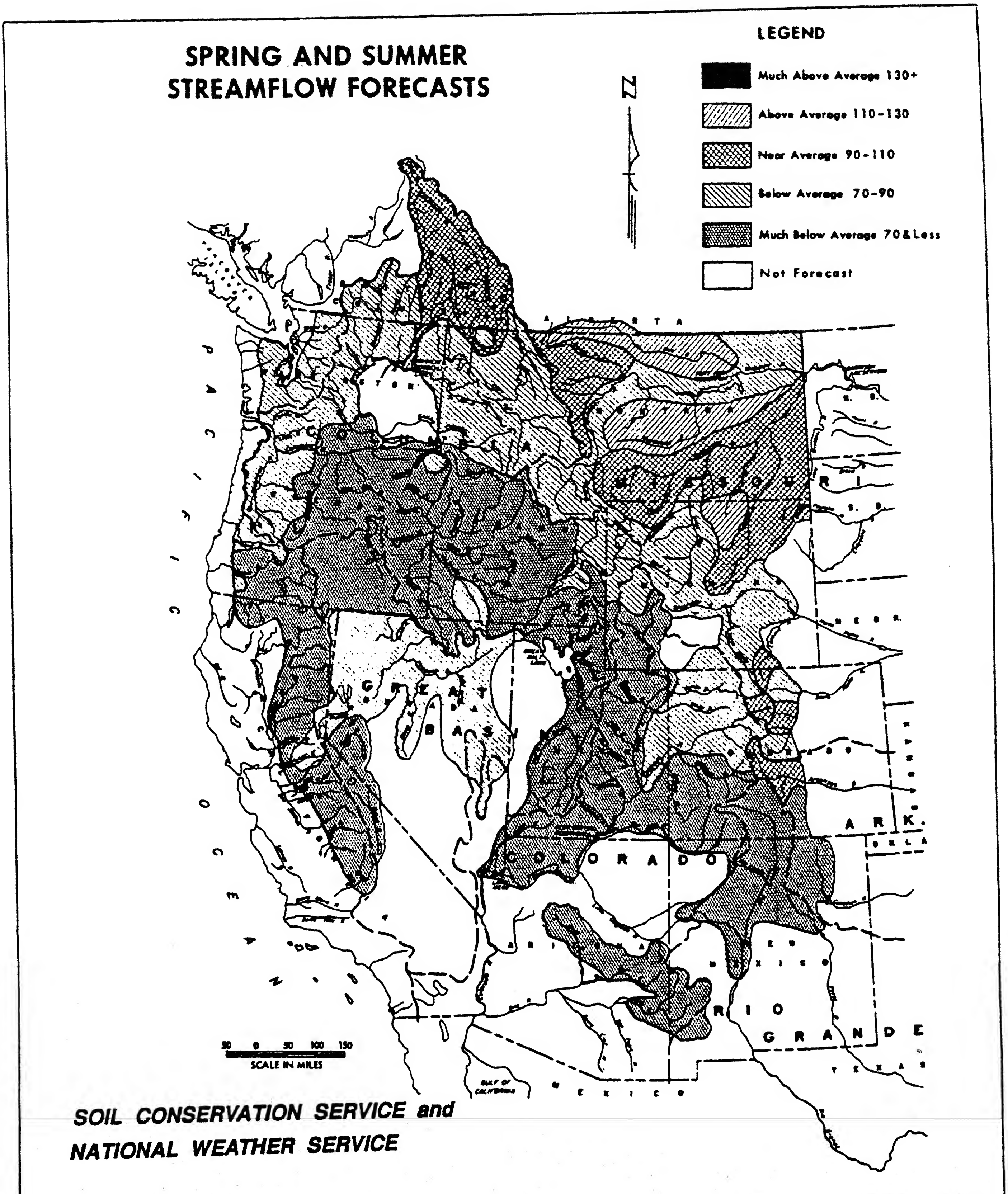


Figure 3. Spring and summer streamflow forecasts as of January 1, 1990 obtained from the Water Supply Outlook for the Western United States, page 7. Based upon conditions at the end of December 1989, the forecast called for below normal streamflow across much of the southern and central areas and near to slightly above normal streamflow in the northern sections. No areas were forecasted to be much above average (>130% of normal).